

(56)

References Cited

U.S. PATENT DOCUMENTS

- 2002/0071848 A1 6/2002 Smith et al.
 2003/0148262 A1 8/2003 Polo et al.
 2003/0232058 A1 12/2003 Dubensky et al.
 2004/0022681 A1 2/2004 Hantschel et al.
 2004/0115167 A1 6/2004 Cormier et al.
 2004/0141984 A1 7/2004 Bachmann et al.
 2006/0280644 A1 12/2006 Sellers et al.
 2008/0125743 A1 5/2008 Yuzhakov
 2009/0246215 A1 10/2009 Bachmann et al.
 2010/0027174 A1 2/2010 Galy et al.
 2010/0152701 A1 6/2010 McAllister et al.
 2010/0285135 A1 11/2010 Wendorf et al.
 2010/0297174 A1 11/2010 Garcia-Sastre et al.
 2010/0330121 A1 12/2010 Dubensky, Jr. et al.
 2011/0002958 A1 1/2011 Perri et al.
 2011/0064767 A1 3/2011 Leberre et al.
 2011/0200582 A1 8/2011 Baryza et al.
 2011/0300205 A1 12/2011 Geall et al.
 2012/0016309 A1 1/2012 Binks et al.
 2013/0004427 A1 1/2013 El-Sayed et al.
 2013/0149375 A1 6/2013 Geall
 2013/0177639 A1 7/2013 Geall et al.
 2013/0177640 A1 7/2013 Geall et al.
 2013/0183355 A1 7/2013 Jain et al.
 2013/0195968 A1 8/2013 Geall et al.
 2013/0295043 A1 11/2013 Kallen et al.
 2013/0315955 A1 11/2013 Holtz et al.
 2014/0030292 A1 1/2014 Franti et al.
 2014/0193484 A1 7/2014 Bertholet et al.
 2014/0227346 A1 8/2014 Geall et al.
 2014/0242152 A1 8/2014 Geall et al.
 2014/0271829 A1 9/2014 Lilja et al.
 2014/0303232 A1 10/2014 Baryza et al.
 2014/0309277 A1 10/2014 Baryza et al.
 2015/0024002 A1 1/2015 Perri et al.
 2015/0038897 A1 2/2015 Daddona et al.
 2015/0175975 A1 6/2015 Nasar et al.
 2015/0202281 A1 7/2015 Renner et al.
 2015/0299728 A1 10/2015 Rayner et al.
 2016/0108372 A1 4/2016 Tratschin et al.
 2016/0129105 A1 5/2016 Von et al.
 2016/0213908 A1 7/2016 McAllister et al.

FOREIGN PATENT DOCUMENTS

- EP 1392341 A2 3/2004
 EP 1604688 A1 12/2005
 EP 2055312 A1 5/2009
 EP 2332573 A1 6/2011
 EP 2338510 A1 6/2011
 EP 3047856 A1 7/2016
 EP 3061826 A1 8/2016
 WO WO-9748440 A1 12/1997
 WO WO-9846262 A1 10/1998
 WO WO-0061770 A2 10/2000
 WO WO-02056907 A2 7/2002
 WO WO-2004016282 A1 2/2004
 WO WO-2006130826 A1 12/2006
 WO WO-2006138719 A2 12/2006
 WO WO-2007081430 A2 7/2007
 WO WO-2012006369 A2 1/2012
 WO WO-2012051211 A2 4/2012
 WO WO-2013055905 A1 4/2013
 WO WO-2013137831 A1 9/2013
 WO WO-2014005959 A1 1/2014
 WO WO-2014108515 A1 7/2014
 WO WO-2015024667 A1 2/2015
 WO WO-2015034924 A1 3/2015
 WO WO-2015063112 A1 5/2015
 WO WO-2015110656 A1 7/2015
 WO WO-2015189205 A1 12/2015
 WO WO-2016073410 A1 5/2016
 WO WO-2016118725 A1 7/2016
 WO WO-2016135675 A1 9/2016
 WO WO-2018026955 A1 2/2018

OTHER PUBLICATIONS

- Ameri M., et al.; Demonstrated Solid-State Stability of Parathyroid Hormone PTH(1-34) Coated on a Novel Transdermal Micropjection Delivery System; *Pharmaceutical Research*, vol. 26, No. 11, Nov. 2009.
 Ameri M., et al.; Human Growth Hormone Delivery with a Microneedle Transdermal System: Preclinical Formulation, Stability, Delivery and PK of Therapeutically Relevant Doses; *Pharmaceutics* 2014, 6, 220-234. 0.
 Ameri M., et al.; Parathyroid Hormone PTH(1-34) Formulation that Enables Uniform Coating on a Novel Transdermal Micropjection Delivery System; *Pharmaceutical Research*, vol. 27, No. 2, Feb. 2010.
 Bachy, V. et al. Langerin negative dendritic cells promote potent CD8+ T-cell priming by skin delivery of live adenovirus vaccine microneedle arrays. *Proc Natl Acad Sci U S A*. Feb. 19, 2013;110(8):3041-6.
 Bragazzi NL; Fluzone® intra-dermal (Intanza®/Istivac® Intradermal): An updated overview; *Hum Vaccin Immunother*. Oct, 2, 2016;12(10):2616-2627. doi: 10.1080/21645515.2016.1187343. Epub May 31, 2016.
 Brazzoli M., et al.; Induction of Broad-Based Immunity and Protective Efficacy by Self-amplifying mRNA Vaccines Encoding Influenza Virus Hemagglutinin.; *J Virol*. Oct. 14, 2015;90(1):332-44.
 Chahal, J.S. et al. Dendrimer-RNA nanoparticles generate protective immunity against lethal Ebola, H1N1 influenza, and Toxoplasma gondii challenges with a single dose. *Proc Natl Acad Sci U S A*. Jul. 19, 2016;113(29):E4133-42.
 Chong, R.H., et al. Gene silencing following siRNA delivery to skin via coated steel microneedles: In vitro and in vivo proof-of-concept. *J Control Release*. Mar. 28, 2013;166(3):211-9.
 Chu L., et al.; Enhanced Stability of Inactivated Influenza Vaccine Encapsulated in Dissolving Microneedle Patches; *Pharm Res* (2016) 33:868-878.
 Criscione, et al. Self-assembly of pH-resistant fluorinated dendrimer-based particulates for drug delivery and noninvasive imaging. *Biomaterials* 30(2009):3946-3955.
 Edens C; A microneedle patch containing measles vaccine is immunogenic in non-human primates. *Vaccine*. Sep. 8, 2015;33(37):4712-8.
 Edens C; Inactivated polio vaccination using a microneedle patch is immunogenic in the rhesus macaque. *Vaccine*. Sep. 8, 2015;33(37):4683-90.
 Geall, A.J., et al. Nonviral delivery of self-amplifying RNA vaccines. *Proc Natl Acad Sci U S A*. Sep. 4, 2012;109(36):14604-9.
 Gill, H. S. et al. Coated microneedles for transdermal delivery. *J. Control Release*, 117(2):227-237 (Feb. 12, 2007).
 Gonzalez-Gonzalez, E. et al. Silencing of reporter gene expression in skin using siRNAs and expression of plasmid DNA delivered by a soluble protrusion array device (PAD). *Mol Ther*. Sep. 2010;18(9):1667-74.
 Haigh, O. et al. CXCL1 gene silencing in skin using liposome-encapsulated siRNA delivered by microporation array. *J Control Release*. Nov. 28, 2014;194:148-56.
 International Application No. PCT/US17/13043 International Search Report and Written Opinion dated Jun. 2, 2017.
 International Application No. PCT/US2017045161 International Search Report dated Nov. 13, 2017.
 Kalomiraki M., et al; Dendrimers as tunable vectors of drug delivery systems and biomedical and ocular applications. *Int J Nanomedicine*. Dec. 22, 2015;11:1-12.
 Kim YC; Microneedle delivery of trivalent influenza vaccine to the skin induces long-term cross-protection. *J Drug Target*. Dec. 2016;24(10):943-951.
 Kim, Yeu-Chun, et al. Enhanced Memory Responses to Season H1N1 Influenza Vaccination of the Skin with the Use of Vaccine-Coated Microneedles. *The Journal of Infectious Diseases* 201:190-198 (Jan. 15, 2010).